

PATENT SPECIFICATION

591,949



Application Date Oct. 25, 1944.

No. 20785/44.

Complete Specification Left: Nov. 23, 1945.

Complete Specification Accepted: Sept. 3, 1947.

PROVISIONAL SPECIFICATION

An Improved Bolting Device

We, ALLAN ROBERT BLACKWOOD, CECIL ARTHUR TAYLOR, both British Subjects, and THE RAWPLUG COMPANY LIMITED, a British Company, all of Rawlplug House, Cromwell Road, South Kensington, London, S.W.7, do hereby declare the nature of this invention to be as follows:—

This invention relates to an improved bolting or fixing device of the kind known as a toggle bolt, comprising a screwthreaded bolt, a nut, and a member associated with the nut and capable of being inserted through a prepared hole in a fixture such as a hollow tile or thin partition wall and thereafter movable into a position substantially normal to the axis of the bolt member, thus preventing withdrawal of the bolt from the hole and enabling an effective fixing to be made of a desired article to the hollow tile, thin partition wall or like fixture. Such toggle bolts are of particular importance in prefabricated building construction, where considerable use is made of plaster board and like relatively thin partition members, in which the conventional wall plug commonly employed for fixing is not capable of employment or is not satisfactory in service, for example where it is desired to secure an inner walling board to an outer sheet steel walling member.

According to the present invention, the improved toggle bolt comprises a screwthreaded bolt member, a nut upon such bolt member, and a cross-bar or toggle pivotally mounted upon such nut so as to be capable of lying substantially parallel with or at right angles to the axis of the bolt, such toggle member being of substantially tubular, preferably cylindrical, shape, and having a slot to accommodate the bolt while held parallel to the axis thereof. The edges of the slot may be plain or serrated.

By the provision of a cross-bar or toggle of substantially cylindrical shape, the entry of the toggle bolt into the prepared hole is facilitated and the minimum size of prepared hole in the walling board or the like is required, while further, the maximum amount of metal is

provided in the nut member.

According to a further feature of the invention, the improved toggle bolt is provided with a washer formed integrally with means whereby the bolt member and the washer proper may be centred in the prepared hole in the walling board or the like. Such washer and centring means may further be combined in accordance with the invention with a cap or cover whereby the head of the bolt may be concealed from view when the fixing is complete, and may be protected against deterioration by contact with the atmosphere. This latter function is of some importance where it is desired to employ fixing devices extending inwardly from the outer skin of a building, e.g. where external walling members of thin sheet material are to be secured to frame members of the building.

The invention may be carried into practice as will now be described with reference to one constructional form of toggle bolt in accordance therewith.

In the said constructional form of the invention, the cross-bar or toggle is formed from a strip of sheet metal, bent to a substantially cylindrical tubular shape and having a slit the width of the diameter of the bolt provided therein. Apertures are formed in the metal strip which, when the strip has been brought to tubular shape, form diametrically opposed bearing holes into which are inserted ears or projections on the nut member serving as pivots therefor. A third aperture is provided between such pivot holes in the tubular cross-bar, serving to allow the end of the bolt, when the latter is rotated within the nut to a position where the end of the bolt is between the bearing holes in the cross-bar, to pass through the aperture in a direction substantially normal to the axis of the cross-bar, or when the cross-bar is already at right angles to the axis of the bolt, to allow the cross-bar to be brought to a position where its axis is coincident with that of the bolt, the bolt then lying within the tubular cross-bar after passing through the longitudinal slit therein.

The bearing holes formed in the tubu-

lar cross-bar are advantageously formed at a part thereof adjacent to one end, and not centrally thereof, so that when the toggle bolt has been inserted into a prepared hole until the cross-bar is entirely beyond the inner face of the walling board or the like in which the hole has been made, the said cross-bar automatically falls under the influence of gravity to a position in which its longitudinal axis is in a vertical plane. If desired, however, any suitable spring means associated with the cross-bar or with the nut may be provided to impart a positive movement of the cross-bar from a position where its axis is parallel to that of the bolt to one where it lies substantially at right angles thereto.

According to this invention, there may be provided on the shank of the bolt a washer having on the side thereof remote from the head of the bolt an inward tubular extension or bush of the same diameter as that of the cross-bar or toggle, whereby the bolt is centred in the hole and the washer is itself centred upon the outer face of the prepared hole. Such a washer may be combined with a cap or cover whereby the metal parts of the fixing, e.g. the head of the bolt, are protected against the weather and the covering of the head of the bolt in this way also protects the fixing from unauthorised interference as well as imparting a pleasing appearance thereto. Such means may conveniently comprise a flange extending upwardly around the head of the bolt, and a cap or plug adapted to be screwed or driven into or around such upstanding flange when the fixing is complete.

For exterior fixings, the washer may advantageously be made of a resilient or deformable material, such as hard rubber or a suitable plastic material, and the cap or plug may be moulded in the same or a different plastic or turned in wood. Alternatively, a combination of a metal washer with a plastic cap or vice versa may be used, depending on whether the fixing is internal or external and the decorative effect required.

In an adaptation of such combined washer, centring means and cover member for use in the interior fixing of domestic appliances and fittings, such appliances and fittings may be provided with countersunk or recessed holes to receive a fixing device, so that when the fixing has been made, the cover member forming part of the washer and centring means lies flush with the normal surface of the appliance or fitting in question, thus concealing the head of the bolt and imparting a pleasing appearance to the whole.

It will be appreciated that the combined washer and cover member above described, either with or without the centring means, is not confined in use to fixing devices such as toggle bolts, but such combined washer and members may advantageously be employed to protect and cover from view the head of any driven fastening member such as a wood or metal screw, a nail or the like.

Dated this 25th day of October, 1944.

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Chancery Lane, London, W.C.2.
Agents for the Applicants.

COMPLETE SPECIFICATION

An Improved Bolting Device

We, ALLAN ROBERT BLACKWOOD, CECIL ARTHUR TAYLOR, both British Subjects, and THE RAWLPLUG COMPANY LIMITED, a British Company, all of Rawlplug House, Cromwell Road, South Kensington, London, S.W.7, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to an improved bolting or fixing device of the kind known as a toggle bolt, comprising a screwthreaded bolt, a nut, and a member associated with the nut and capable of being inserted through a prepared hole in a fixture such as a hollow tile or thin partition wall and thereafter movable into a position substantially normal to the axis of the bolt member, thus pre-

venting withdrawal of the bolt from the hole and enabling an effective fixing to be made of a desired article to the hollow tile, thin partition wall or like fixture. Such toggle bolts are of particular importance in prefabricated building construction, where considerable use is made of plaster board and like relatively thin partition members, in which the conventional wall plug commonly employed for fixing is not capable of employment or is not satisfactory in service, for example where it is desired to secure an inner walling board to an outer sheet steel walling member.

According to the present invention, the improved toggle bolt comprises a screwthreaded bolt member, a nut upon such bolt member, and a cross-bar or toggle pivotally mounted upon such nut

so as to be capable of lying substantially parallel with or at right angles to the axis of the bolt, and one or more teeth, pointed projections or the like, is or are
 5 provided on the cross-bar or toggle to grip the inner surface of the partition, tile or the like through a hole in which the toggle bolt has been inserted when the bolt is screwed inwardly into the nut.

10 The toggle or cross-bar is preferably of substantially cylindrical shape, having a longitudinally-extending slot to accommodate the bolt while held parallel to the axis thereof, the entry of the toggle bolt
 15 into the prepared hole being thereby facilitated and the minimum size of prepared hole in the walling board or the like is required, while further, the maximum amount of metal is provided in the nut member. The teeth, projections, serrations or the like are in this case
 20 formed upon the edges of the longitudinal slot in the tubular cylindrical toggle or cross-bar.

25 If desired, the improved toggle bolt may be provided with a washer formed integrally with means whereby the bolt member and the washer proper may be centred in the prepared hole in the walling board or the like. Such washer and
 30 centring means may further be combined with a cap or cover whereby the head of the bolt may be concealed from view when the fixing is complete, and may
 35 be protected against deterioration by contact with the atmosphere. This latter function is of some importance where it is desired to employ fixing devices extending inwardly from the outer skin of a
 40 building, e.g., where external walling members of thin sheet material are to be secured to frame members of the building.

The invention may be carried into practice as shown in the accompanying
 45 drawing, in which one constructional form of toggle bolt is illustrated.

In the said drawing:

Figure 1 is a side view of a toggle bolt in accordance with the invention,
 50 with the parts thereof in position for insertion through a prepared hole in a wall or the like.

Figure 2 is a section on the line II-II of Figure 1.

55 Figure 3 is a central sectional view showing the parts of the toggle bolt of the preceding Figures in the positions they assume when in place holding a fitting in position against a wall.

60 Figure 4 is a view similar to Figure 3, showing the use of a centring washer with the toggle bolt.

Figure 5 is a sectional detail view of the centring washer shown in Figure 4,
 65 and Figure 6 is a perspective view to a

larger scale of the toggle bolt shown in Figures 1 to 4.

As shown in the said drawing, the cross-bar or toggle is formed from a strip
 70 1 of sheet metal, bent to a substantially cylindrical tubular shape and having a slot 2 provided therein which is at least as wide as the diameter of the bolt 6. Apertures are formed in the metal strip
 75 1 which, when the strip has been brought to tubular shape, form diametrically opposed bearing holes 3 into which are inserted ears or projections 4 on the nut
 80 member 5 serving as pivots therefor. A third aperture 7 is provided between such pivot holes 3 in the tubular cross-bar 1, serving to allow the end of the
 85 bolt 6, when the latter is rotated within the nut 5 to a position where the end of the bolt is between the bearing holes in the cross-bar, to pass through the
 90 aperture 7 in a direction substantially normal to the axis of the cross-bar, or when the cross-bar 1 is already at right angles to the axis of the bolt 6, to allow
 95 the cross-bar to be brought to a position where its axis is coincident with that of the bolt, as shown in Figure 1. the bolt 6 then lying within the tubular cross-bar after passing through the longitudinal slot 2 therein.

The bearing holes 3 formed in the tubular cross-bar 1 are advantageously
 100 formed at a part thereof adjacent to one end as shown in the drawing, and not centrally thereof, so that when the toggle bolt has been inserted into a prepared
 105 hole 8 until the cross-bar 1 is entirely beyond the inner face of the walling board or the like 9 in which the hole has been made, the said cross-bar automatically
 110 falls under the influence of gravity to a position in which its longitudinal axis is in a vertical plane as shown in Figures 3 and 4. If desired, however, any suitable spring means associated with the
 115 cross-bar 1 or with the nut 5 may be provided to impart a positive movement of the cross-bar from a position where its axis is parallel to that of the bolt 6 to one where it lies substantially at right angles thereto.

In accordance with the invention, in order to provide a positive grip of the
 120 cross-bar upon the inner surface of the walling board or the like 9, when the bolt 6 has been screwed into the nut 5 to draw the cross-bar against such inner surface, teeth or pointed projections such
 125 as are shown at 15 are formed upon such cross-bar, e.g., at one or both of its ends.

According to this invention, there may be provided on the shank of the bolt a
 130 washer 10 having on the side thereof remote from the head of the bolt an in-

ward tubular extension or bush 11 of the same diameter as that of the cross-bar or toggle 1, whereby the bolt 6 is centred in the hole 8 and the washer 10 is itself centred upon the outer face of the prepared hole. Such washer 10 may be combined with a cap or cover whereby the metal parts of the fixing, e.g., the head 13 of the bolt, are protected against the weather and the covering of the head of the bolt in this way also protects the fixing from unauthorised interference as well as imparting a pleasing appearance thereto. Such means may conveniently comprise a flange 14 on the washer 10 extending upwardly around the head of the bolt, and a cap or plug 12 adapted to be screwed or driven into or around such upstanding flange 14 when the fixing is complete.

For exterior fixings, the washer 10 may advantageously be made of a resilient or deformable material, such as hard rubber or a suitable plastic material, and the cap or plug 12 may be moulded in the same or a different plastic or turned in wood. Alternatively, a combination of a metal washer with a plastic cap or *vice versa* may be used, depending on whether the fixing is internal or external and the decorative effect required.

In an adaption of such combined washer, centring means and cover member, 10, 11, 12 for use in the interior fixing of domestic appliances and fittings, such appliances and fittings may be provided with countersunk or recessed holes to receive a fixing device, so that when the fixing has been made, the cover member forming part of the washer and centring means lies flush with the normal surface of the appliance or fitting in question, thus concealing the head of the

bolt and imparting a pleasing appearance to the whole.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A toggle bolt comprising a screw-threaded bolt member, a nut on such bolt member, and a cross-bar or toggle pivotally mounted on such nut so as to be capable of lying substantially parallel with or at right angles to the axis of the bolt, wherein one or more teeth, pointed projections or the like is or are provided on the cross-bar or toggle to grip the inner surface of a walling board or the like through a hole in which the toggle bolt has been inserted when the bolt is screwed inwardly into the unit.

2. A toggle bolt according to claim 1, wherein the toggle member or cross-bar is of substantially cylindrical shape, and is formed with a longitudinally extending slot to accommodate the bolt while the latter is held parallel to the axis of the toggle, the teeth or projections being provided upon either or both edges of such slot.

3. A toggle bolt according to claims 1 or 2, wherein the pivotal mounting of the toggle member or cross-bar upon the nut is at a point on such toggle member spaced apart from its centre of gravity.

4. The improved toggle bolt, constructed and operating substantially as hereinabove described with reference to the accompanying drawing.

Dated this 23rd day of November, 1945.

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Chancery Lane, London, W.C.2.
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[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 1.

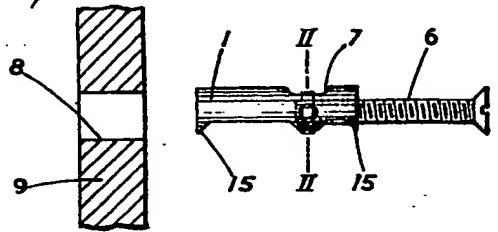


FIG. 2.



FIG. 3.

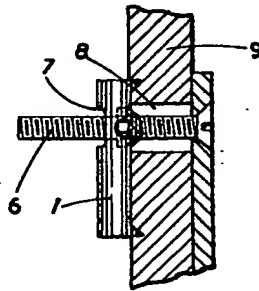


FIG. 4.

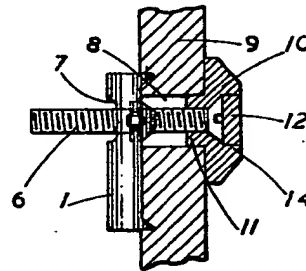


FIG. 5.

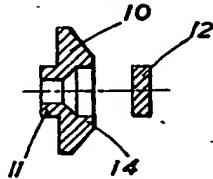


FIG. 6.

